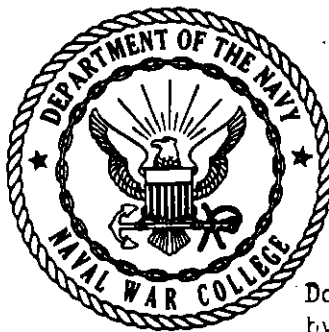


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ABSTRACT OF

THE POTENTIALITIES OF MINE WARFARE

The naval mine is one of the oldest, and least glamorous of weapons. It has historically lacked appeal to career officers in the United States Navy, but has been encountered in every war we have had to fight. The consistent pattern of neglect-in-peace and need-in-war would seem to provide all the evidence necessary to point up what is a vital weakness in our present Navy.

Perhaps the same has been said at the close of each of our wars, but it would appear that our present position is not as dark this time as it has been in the past. The purpose, and nature of the threat, of mine warfare have changed. What has not changed is the United States Navy relegation of this form of warfare to the bottom of the list.

If changing times correctly argue for a lessened United States effort in the field of mine warfare, they have not argued for the lessened appreciation but still irreplaceable role that it may play today.

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INTRODUCTION

It is the intent of this paper to contend that history has given the United States Navy ample lessons in the consequences of the neglect of the mining and mine countermeasures aspects of naval warfare. While our efforts in this field have invariably been boom or bust, crash-building-up in wartime and equally all-out disregard in peacetime, the place of mine warfare in today's naval picture may not warrant drawing the obvious conclusion therefrom.

In treating the subject the writer has attempted to show the development of mine warfare throughout the years and the part it has played in past wars. It is not intended to advocate an overriding high priority for mine warfare, but rather to place it in the proper context. It is hoped to point out the areas in this ancient field which are in need of increased emphasis and awareness.

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CHAPTER I
DEVELOPMENT OF THE MINE

The naval mine is one of the oldest weapons in the U. S. Navy arsenal, and the least glamorous, least understood, and most persistent in its refusal to become obsolete.

The Dutch, in 1585, first applied the principle of mining by floating power-filled boats against the Spanish fleet at Antwerp. The British, in a similar manner, used "floating petards" off La Rochelle in 1628, although neither of these early efforts created underwater explosions. Nevertheless, mining, the ugly duckling of naval warfare, was born. (7:7)

The true founder of the naval mine as we know it today was David Bushnell. In 1776, Bushnell had developed the one-man submarine (boat), after having first established that gun powder could be exploded underwater, and the naval mine was a natural outgrowth of his underwater activity. During the Revolution Bushnell made several attempts to place his mine under British fleet units anchored in the harbors of New York and New London, and in Delaware Bay. (7:9) While Bushnell never did successfully sink a British Man-of-War, he did establish the fact that the mine's least calculable, but most potent value, included the deterrent effect as to the use of mined waters, the deleterious effect on the enemy's morale and on his willingness to proceed in the unknown face of the mine's hidden danger.

Robert Fulton, of steamboat fame, tried to sell the aforementioned idea of mining to the French during the revolution for use against the

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British fleet who were blockading French ports. When the French refused, Fulton left France and placed his ideas before the British government. Once again he was turned down, and in 1806 he returned to America where he continued his work. It was Fulton's contribution which became the first modern prototype of the moored mine, and many of his ideas are still in use today in stockpiled U. S. moored mines. (7:15)

The next significant advance in the act of mine warfare was contributed by Samuel Colt, of revolver fame, in 1843. Mr. Colt adapted electricity to the firing circuit and successfully sank a moving ship five miles from land. The moment to fire was signalled to shore when contact was made between the ship and the mine which closed an electrical circuit. (7:16) This system was used to deter the Danish fleet from forcing entry into Kiel Harbor during the Schleswig-Holstein War.

The mine was first used defensively by the Russians in the Crimean and Turkish Wars in protecting their Black Sea harbors. This not only marked the beginning of awareness of mine warfare's usefulness by our present potential enemy, but marked the first example of what has become the traditional concept of its use as an anti-shipping weapon of the naval underdog.

In the American Civil War, the South, being numerically inferior to the North in the matter of ships, theirs the weaker sea power, developed at least a dozen types of mines, including spar percussion, hydrogen, and horological firing mechanisms. They were able to sink thirty Union ships by mining against only nine by gunfire. (6:82)

During the Russo-Japanese War of 1904 - 1905, both sides used mines with considerable effectiveness. This was the first extensive use of

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independent or open-sea mining, and, therefore focused international military attention on the role of the mine in naval operations. The Japanese mined the Russian bases at Port Arthur and Vladivostok, while the Russians employed mines in the sea lanes which the Japanese fleet were using in their blockade of Port Arthur. (18:77-81) The Japanese lost two battleships, four cruisers, two destroyers and one torpedo boat, while the Russians lost one battleship, one cruiser, two destroyers, one torpedo boat and one gunboat. (7:35) The Russo-Japanese War proved that the mine has to be considered an offensive as well as a defensive weapon.

With the proven operational value of mining in naval warfare, the first efforts began to be devoted to developing mine countermeasures. In the beginning mines were cleared by countermining, by towing grappling hooks astern, by towing a bight of wire, between two vessels. In the early 1900's, the British, developed moored minesweeping equipment in which the wire was spread by means of otters similar to those used by fishing craft. This system was called "Oropessa", and except for modifications in the weight and size of the gear and minor technical improvements, it was the moored sweep used by all nations in both World Wars, and by the U. S. in Korea.

By the start of World War I, the United States had established its unfortunate tradition of unconcern in the field of mine warfare. Little or no interest, and even less advance had been made since the Civil War. The British, too, had neglected mine development, so that as a consequence there were no stockpiles of mines available to the allies which could be used to counter the increasing menace of the German submarines. The

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Germans on the other hand had carefully noted the tactical value and effectiveness of mines in the Russo-Japanese War. At the outbreak of World War I Germany had accumulated a comparatively large stock of mines. (18:84) Monday morning quarterbacks of that period were beginning to wonder why the British had not mined the North Sea to prevent access to the Atlantic Ocean to German submarines. At this stage of the war the British were still experimenting with mines. They had discovered that the design which they had used up to this time, the same design the U. S. Navy had, was defective. (24:298) It was estimated that some 400,000 mines would be needed to seal the North Sea. This was not only more mines than existed in the entire world at that time, but more than could be produced in a reasonable time. The amount of work necessary to construct the North Sea Barrage was enormous. Contracts for the supply of mines were divided between 140 principal contractors and 400 sub-contractors. A mine charging plant capable of dealing with 1,000 mines a day was erected and 20 merchant ships were detailed for the sole purpose of bringing mines from the United States to Great Britain. (18:88) As a result of this huge effort, the United States and England managed to emplant some 71,000 mines in the greatest mining effort ever attempted. Although the number of German submarines lost by attempting to pass the barrage is not known, once the Germans discovered its existence they ceased navigation in the open North Sea routes, and began to slip past the eastern end in Norwegian waters. The fact that the gate left open was comparatively narrow enabled the allied navies to keep a tighter watch on the movements of German submarines from their bases in a northerly direction. (18:89)

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An analysis of German records after the war shows that the barrage had a serious effect on the morale of submarine crews and on the willingness of their skippers to penetrate it. Had the barrage been laid earlier in the war, the effect could have been expected to be of the greatest significance in the ASW effort.

"Until World War I, naval men tended to look upon mine warfare as akin to 'rat catching', but with the creation of the Mine Force on 10 July 1915 and the building of the Bud-class sweepers, U. S. mine warfare came of age." (6:84) Prior to this time the mine force had been part of the regular fleet. The fact that mining was such a large part of the naval contribution of the U. S. in the First World War led to placing the force under its own flag officer. The results of this vast American effort in the North Sea are perhaps best described by Admiral Sims:

"The results other than the sinking of submarines were exceedingly important in bringing the war to an end. It was the failure of the submarine campaign which defeated the German hopes and forced their surrender; and in this defeat the barrage was an important element. That submarines frequently crossed it is true; there was no expectation, when the enterprise was started, that it would absolutely shut the U-boats in the North Sea; but its influence in breaking down the German morale must have been great. The width of this barrage ranged from fifteen to thirty-five miles; it took from one to three hours for a submarine to cross this area on the surface and from two to six hours under the surface." (24:307)

In addition to the North Sea Barrage, the Allies conducted mine-laying operations off Scapa Flow, off the Strait of Dover, off the coasts of England, Scotland, Belgium, Holland, and in the Mediterranean, off the Dardanelles, Awali Bay, Cape Otranto, the Gulf of Smyrna, and in Grova Bay. The Germans, too, decided to use controlled mines to protect their harbors, and all their naval vessels, including submarines, had a mine-

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laying capability. Before the end of 1914, the Germans planted some 800 mines off the English coast which accounted for about 50 ships of various types within about six months. In 1915 the Germans developed a mine-laying capability in their submarines of 12 mines per submarine. These were used to lay fields off Dover, Harwich, and Yarmouth. In four months the Germans planted some 600 mines in the entrances to the above ports with submarines, and from July to December of 1915 the British lost 103 ships in these fields. In all the Germans planted over 43,000 mines in all parts of the world, the majority in innumerable small fields around the coasts of Great Britain, France, Italy, and Greece. The British Empire alone lost 40 warships, 22 auxiliaries, 63 fishing craft, and 260 merchant ships to these small fields. The total lost of Allied merchant shipping to mines in World War I was 586 ships, representing 1,000,000 tons. (7:86)

Despite the Allies' knowledge that the Germans were stockpiling mines before the war, the Allied countermeasures force was virtually non-existent. The British countermeasures force consisted of only 6 old gunboats fitted for sweeping while the United States Navy did not possess a single minesweeper. The British were forced to call on 194 fishing trawlers to carry the initial sweeping burden created by the German mine-laying campaign against the British Isles. By the end of World War I, their countermeasures force consisted of 726 ships, of which 412 were trawlers, and required 600 officers and 15,000 men to operate this force. In 1914 the United States Navy Mine Warfare Force consisted of but 3 minelayers the United States Mine Squadron sent to England in 1918 to assist in laying the North Sea Barrage consisted of 9 minelayers and 4 seagoing tugs, somewhat optimistically designated as

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sweepers. No minesweepers were completed in this country prior to the end of the war. The majority of personnel assigned to the Mine Force in the First World War were reserves, the pattern we have followed since. When they were demobilized, however, their knowledge and enthusiasm appears to have been mustered out of the Navy with them, for mine warfare was all but forgotten between wars.

"The peacetime Navy wasted no money turning out new mines, although such economy was probably not entirely due to the fact that battleships looked better in newsreels. At one time, before the doings of Hitler and Mussolini became front page news, the Navy's entire mine warfare effort was embodied in one physicist at the Naval Ordnance Laboratory. New mine types were designed but never got beyond the blueprint stage." (16:17)

In short, no money or effort was put into mines, mining, or minesweeping techniques after World War I.

Again, as after the Civil War, the Mine Force had been forgotten. The reduction in ships can be understood in an era of long mobilization times and limited budgets, but the reduction in interest, the loss of painfully acquired skills, and the failure to maintain a nucleus force for rapid wartime expansion is less easily explained. Is it merely the lack of glamour or shortsightedness? Surely the maintenance of at least an active reserve Mine Warfare component would have been justified based on the lessons of the war. But it has taken (the use of) our opponents to teach us the obvious lessons in a succession of conflicts. By the time the naval buildup which was a prelude to World War II was underway, the unfortunate pattern of U. S. mine warfare efforts had been established; crash building, shortsightedness, neglect in peacetime and costly reawakening in war.

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CHAPTER II
WORLD WAR II

When Hitler started his more active war plans in 1939, there were about thirty-nine ships in the United States Navy Mine Force. A high percentage of these were of 1917 vintage. In 1939 the United States Navy started a building program to replace some of the obsolete ships which placed the emphasis on high-speed sweepers (DMS's) and the "Terror" class minelayer. The program was stepped up in 1940 and a number of new and special classes of vessels were programmed. Among these were net tenders, net laying ships, degaussing vessels and coastal mine-sweepers (AMS's). Many of these were not ready until after the United States entered the war. In addition, the personnel situation was in need of rapid expansion to man the ships that were coming off the ways. Late in 1940, the United States Naval Mine Warfare School was commissioned at Yorktown, Virginia to train mineforce personnel for World War II.

Germany startled British mariners out of any complacency they may have had by developing an entirely new application of mine warfare which was to revolutionize the old method of mooring mines, when early in World War II, German planes planted the first aircraft-laid bottom mines.

(24:650) This was the inauguration of the aircraft-laid magnetic mine into warfare, and was the commencement of an impressive array of mines of many types, which included acoustic, pressure, and combinations of magnetic, acoustic, and pressure mines. All of these were pioneered by the Germans, in addition to which they also developed optical and

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sonar mines. Although the British had developed several magnetic mines prior to World War II, they had taken no steps to provide countermeasures against this new weapon. Thus the British had to start a crash countermeasures program with the commencement of the German magnetic mining effort.

The British first attempted to sweep this magnetic influence mine by using large ships with electromagnetic devices in the bow. Although these ships and devices did sweep the mines the ships, and personnel aboard, were in excessive danger. Often the ship itself activated the mine and blocked the very area it was attempting to sweep. They next tried towing a wire with bar magnets supported by wooden floats between two ships. This proved too cumbersome to handle. After many other abortive experiments, they developed the 'L' sweep which consisted of towing a current-bearing buoyant cable astern of the ship.

The United States, not in the war at that time, began to see the potential of mine warfare, and the results of the British experiences played an important part in the establishment of a United States Naval Mine Warfare Section under the Office of the Chief of Naval Operations, and a long-range program emphasizing mine warfare research, was established. This research could have been well underway towards completion, had we not forgotten the lessons of World War I with respect to the threat and potential of the mine.

The Germans realized the potential of their new weapon to the fullest, using it both offensively and defensively. The German magnetic mining effort in November and December of 1939 resulted in the loss of 64 ships of about 20,000 tons each. Even greater results could have been

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achieved by suddenly laying large masses of mines, if these had been dropped in the relatively narrow channels to which enemy coastal shipping was confined. (26:52) During the first six months of the war German mines sunk a total of about 120 merchant ships and several British warships including the battleship Nelson. (26:51)

The Germans gradually extended their offensive mining campaign to the Mediterranean and the Pacific and after the United States entered the war, to the East Coast of the United States.

"Thus Germany waged mine warfare against the United States - 338 mines laid, 10 ships sunk or damaged. Those are understandable statistics. Enemy mines forced the Navy to expand tremendous effort in countermeasures. Minesweepers made regular exploratory sweeps in all the waters of the Eastern Gulf, Caribbean, and Panama Sea Frontier. At one time, 125 sweepers and their crews were so employed at an incalculable expense in time, material and men, which might have been used to better effect elsewhere. Each time a German mine was discovered, local shipping was diverted or curtailed. During 1942 the port of New York, busiest in the world, was closed for two days. Traffic was halted for three days in the Chesapeake Bay, Jacksonville, and Savannah; for eight days in Wilmington; for a total of eleven days at Charleston."(16:53)

The mine operation the Germans presented to the United States included Boston and New Orleans. In the Caribbean they covered Jamaica, San Juan, and Trinidad.

The Germans also put forth a highly successful effort against the Russians when they virtually bottled up the Russian Baltic Fleet in the Gulf of Finland and Riga. For two and a half years the Russians never attempted to pass their surface ships across the mine, submarine, and torpedo boat blockade existing across these two gulfs. The Russian admiral of the Baltic Fleet, I. S. Isakov, although not admitting the effect of the mine blockade, said:

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"Nevertheless the menace of the mine, far from being eradicated, required constant attention and effort and will make itself felt for a long time after the war." (14:15)

The Germans laid many other offensive minefields, too numerous to discuss, but there is one defensive field which is worthy of note. Their greatest defensive effort involved a minefield known as the "West Wall".

"Cruisers, destroyers, and minelayers were used in the attempt to reduce the unfavorable geographical situation of Germany by laying mines in the "West Wall" - a long system of minefields starting in Dutch territorial waters north of Terachelling and extending for 150 miles northward. This publicly declared danger area provided an excellent flank protection against British raids from the west and for practical purposes it moved the exit of the German Bight of the North Sea almost up to the Skagerrak." (26:46)

While the Germans were not the only nation to make effective use of mines during the Second World War, and while both the British and United States planted minefields, had the United States not passed mine warfare off as a 'dirty business' which was not fit for great naval powers, the German submarine threat might not have been as effective.

While the British planted many successful offensive minefields against the Germans, so successful in fact that the Germans used over 2,000 sweepers during the war, the major contribution of the British was in the field of mine countermeasures. As the Germans have historically dominated the mining fields, so the British have dominated the mine countermeasures field. The British developed measures against the magnetic mine, perfected the system of degaussing merchant ships, and just as the threat of the mine was decreasing they had to tackle

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the newest German mining innovation, the pressure and magnetic mines. They soon produced a reasonable counter to the acoustic mine by use of a device which was nothing more than an electrically driven hammer or noise-making machine. These were towed astern of the minesweepers. The pressure mine was something the British had developed too, but were afraid to use for fear it would be used against themselves, since they did not have, and never found, an effective countermeasure for it.

This rapid progress in the arts of mine warfare during the period 1939 - 1940, the United States was required to take a closer look at the problem as it could affect our sea lifelines. While we had been making good progress in mine development, our mine countermeasures potential was all but totally lacking. In 1940 the United States Navy's construction program for minesweepers had started, but was a long way from completion. The "Bird" class sweeper and the converted destroyer minesweeper were of World War I types and their main function in the fleet for the preceding 22 years had been the towing of targets and other services to the fleet everything that is except minesweeping. There were too few sweeps, their minesweeping equipment was unsatisfactory, and their supplies difficult to procure. At the outbreak of war, the Navy attempted to ease the first of these situations by pressing a miscellaneous assortment of fishing boats into service, converting them to coastal minesweepers. The solution to the second problem, the unsatisfactory minesweeping equipment, was not as easy. Not only did new moored minesweeping equipment have to be produced, but new equipment, procedures and techniques had to be developed to counter the magnetic and acoustic mines. Admiral Rickover, then a Lcdr., was attached to the Bureau of Ships and obtained a piece of the British

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magnetic sweep cable. With this cable, he calculated the power requirements for a magnetic minesweep cable. By January of 1941, 17 sweepers were equipped with magnetic minesweep "tails", and the mine countermeasures program called for 117 fleet and 270 district sweepers. Of the commission, and of the 270 district sweepers, 66 were being converted, 64 constructed and 140 merely authorized. (18:10) While the Bureau of Ships ordered minesweeping equipment for 143 additional ships in order to meet the CNO plans, it should be noted that no provision was made for replacement gear with which to cover losses. Experience with high-ratio of losses in active fields had not taught the United States Navy to think big enough. As a result, Oropessa gear had to be air-lifted to Europe during the Mediterranean and European campaigns and in the Pacific we were constantly in the throws of one crisis after another until as late as November, 1945. (18:11) True to form, by the end of World War II we had too much minesweeping equipment in most categories.

Although the Navy was not prepared for an extensive mine warfare campaign in any sense of the word when the Japanese bombed Pearl Harbor, thanks to programs which were started in 1940, we were not caught completely without a mine warfare capability. The need for minesweepers had become apparent in time for the United States Navy to clear the Sicilian Channel for allied shipping and make major contributions to the assaults against Casablanca, Sicily, Salerno, Anzio, Southern France, Normandy, and Cherbourg. The Japanese were almost equally unprepared in the field of mine warfare, their mines were unsatisfactory, but improved with German assistance. Our sweepers in the Pacific were needed in such major operations as Leyte

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Lengayen Gulf, Okinawa, Tarawa, Peleliu, and many others.

The United States Navy's offensive submarine mining campaign against Japan started late in 1942. Before the end of the year we had laid approximately ten fields in Japanese home waters, and submarine mine laying efforts continued throughout the war. While submarines generally disliked this type of duty because the results were seldom apparent as in a torpedo attack, the results were impressive. During the submarine mine-laying campaign, 32 submarines laid 658 mines in 36 fields. Postwar information on 21 of these 36 fields which contained a total of 421 mines, showed 27 ships sunk, 27 ships damaged, 1 ship for every 8 mines planted and no submarines were lost. (17:44)

Operation Starvation. By far the greatest mining campaign conducted by any nation during World War II was "Operation Starvation". The theory of this plan was to starve the 70 million Japanese on the home islands into defeat in 5 months. This effort was something which had never been seen in the long history of warfare. The island empire depended on some 12,000 merchant ships for its existence. The Navy teamed up with the Army and mined every major harbor in Japan and the Shimonseki Straits. While no single effort or battle won the war against Japan, the mining effort which blockaded her searanes was as instrumental as the atomic bomb in forcing Japan's final surrender. In 1945 the Japanese minesweepers were unprepared to clear the same 1,200 mines planted by the United States. This minefield accounted for more than one and one quarter million tons of Japanese shipping. A Japanese Naval Officer, Commander Saburo Tademura, later called

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"Operation Starvation" one of the main causes for the Japanese defeat. Mere control of the occupied land was not enough when that land lay across mineable waters. Those who live by the sea must control it.

(17:40)

The war ended for many but not all Americans in September, 1945. The United States minesweepers still had the problem of clearing the seas of the thousands of mines which had been laid by the participants on both sides. Seven of the twelve minesweepers in commission in the Pacific Fleet, for example, were available early in the Korean War precisely because they were still involved in sweeping the fields we had planted in Japan. This fortunate happenstance enabled the United States to make at least a token initial minesweeping effort in the vital early stages of the Korean conflict.

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CHAPTER III

1945 - PRESENT

At the end of World War II the minecraft in our fleet numbered more than 700 ships of all types, and of this number over 400 were minesweepers. (11:36-39) Budgeting cuts at the completion of the war virtually stopped progress in mine warfare. Approximately 90 per cent of the personnel assigned to minecraft had been reserves, and when they were demobilized after the war the Navy's interest and knowledge was demobilized with them. Mine warfare was again in eclipse. While budgetary cuts are to be expected at the end of a war, and granting that our peacetime fleet could not support a 700-ship mine warfare program, it is still difficult to conceive that the bitterly learned lessons should so completely have been forgotten as they were after the surrender. A basic error in planning had surely taken place. It is impossible to all but eliminate a force that it took years to develop without also eliminating the capability in the field of warfare for which that force was designed. Nevertheless, between 1945 and 1950 the Mine Force, and mine warfare generally, were in a state of the most dismal neglect. The only apparent reason for this state of decline would seem to be the Navy's feeling that mine warfare required but little in any training, experience, or research. In only five years this misconception was to be brought home once again when the Korean conflict drove the point home with vengeance.

In June, 1950, when the Korean War broke out, the Mine Force of the Pacific Fleet was a part of the Pacific Fleet Service Force. In

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Japan we had 1 steel-hulled AM and 6 wooden AMS's. There were 2 AMS's at Guam, 3 at Pearl Harbor and 4 DMS's there also. The DMS's were assigned to Destroyer Force Pacific and were, in fact, used almost exclusively as conventional destroyers. (12:20) Thus the United States Pacific Fleet numbered but 12 minesweepers in the spring of 1950. The Atlantic Fleet was little better off, with only 21 minesweepers assigned. There were also 8 DMS's in the Atlantic Fleet, but again they were utilized as standard destroyers. It seems almost impossible that in 5 years a force of over 700 ships, including 400 minesweepers had dwindled to a total of 50 ships of which only 32 had a minesweeping capability. Even more difficult to understand was the abolishment after the war of Mine Force Command in the Pacific, a command which had only been established in 1944.

"During the last three of those years (1946 - 1949) the Navy's seagoing forces were drastically cut, although the seas still covered the same seven tenths of the world's surface. Such postwar changes in military organization and public thinking produced many results; one of the most striking was the fact that a United States invasion force off Wonsan, Korea, in 1950 some 7,000 miles away from the United States supply of A-bombs and bombers, was virtually stymied for eight days by a Communist minefield. The United States, greatest sea-power in the world in 1945, five years later had lost control of the sea for want of a few minesweepers." (16:269)

Not only had the ships and organization disappeared but the personnel situation was almost equally bleak in 1950. The old feeling that assignment in mine warfare was the 'kiss of death' still being prevalent in the Navy. Before the Korean War was over our Navy had again to rely heavily on its reserve personnel to assist in manning its hastily re-activated minecraft. We will not be as fortunate in any

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future conflict, for these reserves, like the ships they manned, are overage.

The need for minesweeping was not apparent in the first days of the Korean conflict. No mines were encountered when the First Cavalry landed at Pohang during our initial troop buildup. As late as August of 1950 when our ships made exploratory sweeps of the Pusan channel, no mines were found. However, we were soon to learn that what we had forgotten, the Russians had learned, for they practiced the lessons taught them as far back as the Russo-Japanese War. While the Korean conflict was, for the enemy, almost entirely a land war since all of their logistic support was overland, United Nations forces had, of necessity, to depend on oceanic pipelines of over 7,000 miles.

The first actual mine threat to United Nations forces came during the Inchon landings in September of 1950. It was fortunate that it did, for the threat was not severe and it caused an awakening in our Navy to the enemy's intent to contest our free access to his coasts. Our landings were not seriously imperilled, for the widely-ranging tides in the approaches to Inchon exposed the mines on the surface as our pre-invasion bombardment force approached the area. The bombardment forces were thereby able to destroy the mines as they lay floating at low tide. Our minesweepers found no mine during their check sweeping of the landing area. During this period many reports had begun to be received by fleet intelligence of both floating and moored North Korean mines off both coasts. By October, it was apparent that enemy mines were becoming a threat which our pitifully small countermeasures force would be unable to cope with.

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With the realization of the impending mine threat our Navy dispatched the 2 AMS's at Guam and the 3 AMS's at Pearl Harbor to join the forces in Korea. They reactivated 3 AM's based at Yokosuka and ordered them to report for duty. With their arrival, the total number of sweepers available amounted to 14, and none could then be expected for many months. If the mine threat was apparent to the on-the-scene naval commanders, it was less obvious in Washington, for no minecraft were on the priority schedule of reactivation from within the Reserve Fleet.

The mine threat was a reality in October, 1950, for 2 United States destroyers and 2 South Korean (ROKN) minesweepers were damaged while one United States minesweep was sunk by North Korean mines. With the Wonson landing only days away, our minesweepers numbered only 10. It was this landing, and its delay through mines by a non-existent Navy, that finally caused a stateside awakening to a problem recently realized in the battle area.

The Wonson landing was scheduled for 20 October, 1950. Seven minesweepers arrived on the tenth to start the sweeping effort. There was virtually no intelligence on what kind, how many, or even if any mines were in place in the harbor. The sweepers had the task of clearing an 18½-mile channel, 4,000 feet wide, from the 100-fathom curve into the landing area. They were then to clear the anchorage areas for the amphibious ships. During World War II a sweeping effort of similar proportions would have required some 30 minesweepers, even if modestly provided for, while with the commitment of our total force of 10 ships,

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we attempted to do the same job. It soon proved to be a task for which they were hopelessly inadequate. Almost as soon as their otters were in the water, the force began sweeping moored mines. It was many months before the task initially assigned the small force was even reasonably complete.

By the end of the third day, with only 8 days to go before the landing, 2 of the 3 AM's had been sunk by mines. The remaining sweepers continued their efforts and miraculously, were almost ready to declare the area cleared by the eighteenth. On that date several magnetic influence mines were encountered in the anchorage area. All mines previously encountered had been the moored contact type, but the discovery of influence mines required many days of additional sweeping for mines activated by all known influences. When sweeping for moored mines, a ship can achieve up to 450 yards of clearance on one pass, but against influence mines the swept path will vary from 50 to 300 yards depending upon the conditions in the area. With the assistance of some hastily air-lifted mine warfare experts from the United States and the aid of North Koreans who had actually planted the field, the location and types of mines in the field were determined. By 20 October, the assigned area was 90 per cent clear, and the landings took place on the 26th, after the South Korean troops had already occupied Wonson. Over 50,000 troops in 250 ships had been delayed over a week, as Admiral Smith stated in a dispatch to CNO, "We (have) lost control of the sea." The Chief of Naval Operations put it even more vividly:

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"They caught us with our pants down. Those damn mines, cost us eight days' delay in getting troops ashore and more than two hundred casualties. That's bad enough, but I can all too easily think of circumstances when eight days' delay offshore could mean losing a war. We've been plenty submarine-conscious and air-conscious. Now we're going to start getting mine-conscious. Beginning last week." (16:27)

And the United States Navy did become 'mine-conscious', but only for the period during which the emergency lasted.

The period of emergency in mine warfare lasted throughout the Korean War. When the enemy realized the effect of his inexpensive naval effort he began mining all harbors potentially available to the United Nations. By the time Wonsan was declared open to shipping, sweepers were being called for to combat newly-laid minefields in Chinampo, Hungan, Chongjin, and in fire support areas along the Korean East Coast. With only 8 United States minesweepers remaining this was a large order, too large, even after the arrival of the 3 AMS's from Pearl Harbor and the forced use of ROKN sweepers which had been quickly trained to help. Despite all available emergency measures, the total force available in Korea never exceeded 25 minesweepers until mid 1951, when reactivated ships from the United States began to arrive. By that time, too late of course, mine warfare had taken the highest priority in the entire United States Navy.

Most embarrassing, the majority of the mines encountered were 1903 vintage Russian moored contact mines. They were of the most basic design, and were laid by sampans, by a country possessing no Navy at all. Fishing boats, junks, and whatever local craft available had been used by civilians to defeat the greatest Navy in the world with a so-called

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obsolete weapon. If a minor landpower is able to halt a nuclear armed navy with ancient and inexpensive weapons for which ample precedent existed, it would seem it was the nuclear navy's thinking which was obsolete.

In 1951 Commander Mine Force Pacific was reactivated as a command under CINCPACFLT, and COMINLANT was expanding in both countermeasures forces and research and development. By the time the Korean conflict had ended, a non-magnetic minesweeper building program was underway. This program called for 65 minesweepers, it had, as in the past been a 'crash program', and there were no prototypes available. The headaches provided by these new wooden minesweepers are with the Navy to this day. The Bureau of Ships and the operating forces have to contend with wooden hulls of sizes never before constructed, of untried design, with engines, machinery, and fittings of aluminum, brass, magnesium, and other alloys. The materials had been chosen to provide as small a magnetic signature to the ship as possible, but in so doing they seemed to provide maintenance personnel as many difficulties as possible.

These new minesweepers were of three classes: 172-foot Ocean Minesweeper (MSO), a 144-foot Coastal Minesweeper (MSC), and a 57-foot Minesweeping Boat (MSB). As the new sweepers joined the fleet, commencing in 1953, they replaced the old AM's and AMS's which had been redesignated MSF and MSC(O). As of October 1963, our mine force consisted of approximately 84 minesweepers, a few MSC's, (a converted LST or LSD used as a command ship), and a few net tenders and experimental craft. These are about equally divided between the Atlantic

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and Pacific Fleets.

The Mine Force is thus among the few sections of the Navy not suffering from black obsolescence. But, unfortunately, the professional 'kiss of death' attitude and the budgeting facts of life have again begun to relegate mine warfare to the bottom rungs of priority. While lip service is still paid to the lessons of Korea, there is ample evidence that these lessons are in the process of being forgotten.

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CHAPTER IV

USSR CAPABILITY

The USSR's use of the sea mine dates back to the Crimean War of 1854, during which Russia used both controlled and moored contact defensive minefields for protection of her principle Black Sea harbors. At the outbreak of World War I the Soviet's had a large stockpile of contact mines and with their past experience of other wars employed sound mining tactics.

During World War I practically all surface ships of the Russian Navy, including cruisers and destroyers, were equipped to lay mines. It was during World War I that Russia became the naval power to plant mines from a submarine. (23:1) They also developed anti-sweep devices to protect their minefields and destroy German minesweepers. This device was incorporated in the mooring cable of some mines allowing sweep wire of a minesweeper to pass through the mooring without cutting the mine adrift, while other mines were laid at shallow case depth with a specific mission of destroying the minesweepers. By employing these techniques when mining the central Baltic between Rugen Island and Menxel, Russia succeeded in putting out of commission no less than half of the German Baltic Fleet opposing them.

In 1914, the Russians employed submarines to plant their minefields in the Black Sea, these fields damaged two Turkish cruisers. If it were not for the technical defect of too small a charge, these ships would probably have been sunk. (23:2) In 1916 the Russians

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increased their mining effort in the Black Sea, and succeeded in destroying a large portion of the Turkish merchant fleet.

During World War II the Russians fell far short of their expected mining potential, advancing very little technically and tactically in the field of mine warfare. The German minesweeping force found their job simplified by the fact that the Russian submarines always laid their full load of from 12 to 18 mines in one line. The Soviets did come up with a few new ideas in mine warfare to complicate the sweeping of their fields. One was a mine which detonated on the surface a few minutes after it had been swept, thus endangering sweepers in echelon formation. Another rather complicated device was a sweep obstructor capable of destroying four sets of moored sweep gear. As soon as one set of gear was destroyed, another obstructor would automatically replace the one that was exploded.

In the latter part of World War II the Russians improved their mine laying capability by using aircraft, and some uniformity in the operational principles of mine laying aircraft units was established.

At the beginning of the Korean aggression, the Soviets were able to supply the North Koreans with great stocks of mines, technical assistance, and tactical laying instructions. This increased knowledge of mine warfare in so short a time was undoubtedly the effort of the many German, civilian and military mine warfare experts that the Soviet Union acquired at the end of World War II.

The Soviets presently have a stockpile of over 500,000 mines and an estimated annual production of 20,000 mines. It is believed that

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the simple moored mine comprises the bulk of this stockpile. The Soviets have an estimated immediate capability of producing in excess of 100,000 mines per year. (21:1-2-1)

The mine laying capability of the Soviet Navy is immense. All surface ships are equipped to carry mines and approximately 25,000 mines are available aboard ships at any one time. Submarines and aircraft are available in sufficient numbers to support a serious mine threat and not detract from their primary mission. (21:1-2-1)

The Soviets' mine countermeasures forces are large in number and mainly steel-hulled ships comparable in performance to the United States Navy World War II sweepers. These ships are in the following disposition:

<u>Type</u>	<u>Baltic</u>	<u>North</u>	<u>Black Sea</u>	<u>Pacific</u>	<u>Caspian</u>
T-58*	20	2	0	2	0
T-43	50	54	51	20	0
SASHA**	28	0	27	5	0
T-301	50	30	25	0	0
MISC(K-8, TR-40)	40	20	40	0	0

Minesweepers Currently Under Construction:

* 10

** 16 (27:38)

The mine countermeasures are familiar with the minesweeping techniques used by the allied and Germans at the end of World War II. They possess the necessary knowledge and equipment to sweep the conventional magnetic, acoustic and moored type mines. Considerable time and effort are being expended by the Soviets in minesweeping training.

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CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

The Soviet submarine force constitutes the most serious threat to United States control of the seas since World War II. The Soviet submarine construction effort, dating from the early 1950's to the recent past, is clear testimony that the Soviets intend to use the submarine to challenge United States supremacy at sea. Soviet submarines have a potential for strategic mining operations extending to all areas where disruption of maritime commerce would seriously effect a war effort of the United States. Every Soviet submarine is capable of carrying 30 to 40 mines and are within range of all our major east coast and west coast ports. If even a few of their conventional submarines were to scatter small minefields off our ports the military and economic burden which would be placed on the United States would be enormous.

Practically all fast surface ships in the Soviet Navy are equipped to carry mines. The number of especially designed minelayers is relatively low, and the only large vessels whose primary function is to lay mines are converted auxiliary vessels. However, this imposes no restrictions on the Soviet defensive mining capability since there are no great technical difficulties in converting any of a variety of merchant ships for this purpose. Soviet surface units might be used for limited offensive mining in the Baltic and Black Seas and possibly in northern Norway. If the Soviets gained control of the Baltic Sea exits, fast surface craft would be able to make mining sorties into the North Sea

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as far as southern England and if they controlled the Black Sea exits similar operations could be conducted in the Aegean Sea and nearby portions of the Eastern Mediterranean.

Considering the relationship between a minelaying campaign and the sweeping effort required to counter the minefield, it can be said without a doubt that the resources required to sweep one mine are vastly greater than those required to plant it. A point may be reached in the buildup of a minelaying campaign beyond which little additional effort would be required by the minesweeping forces to counter the threat. That is, the laying of a minefield off an important port would require a certain number of minesweepers to be available to make frequent exploratory sweeps and to sweep whatever mines might be discovered. Therefore the forces required to protect a port or harbor against a possible mining campaign will approximate those required to combat an actual minelaying campaign.

It is recommended the United States Navy place greater emphasis on the Mine Force Selected Reserve Program (MWSR) which presently comprises some ten MSC(O)s based in major ports of the United States. These MSC(S)s are manned by eight active enlisted men, and the remainder of the crew and officers are made up of reserve personnel from the area in which the ship is home-ported. The attractiveness of reasonable assurance that wartime duty would be in or near home make recruiting an almost effortless task. The present ten ships in the MWSR program are a large step in the right direction in countering a Soviet mining campaign against our home shores. It is the author's opinion that a minimum organization of

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the MWSR would require approximately 58 ships.

In the field of mining, we must endeavor to develop mines that will be a real threat to Soviet submarines. An adequate minefield extending outward from a promontory of land can deny a submarine passage as effectively as an extension of land. The mine passively laying in waiting, giving no warning of impending destruction is more feared by the submarines than any other weapon. Today, among ASW weapons, only the mine has not been degraded by the high performance characteristics of fast, deep-diving nuclear power submarines. In fact, speed and depth enhance the acquisition characteristics of modern influence mines. The plausible transit route from all Soviet submarine bases to ocean operating areas are mineable (except possibly Petropavlosk). Proper placement of adequate minefields could afford a high probability that significant numbers of Soviet submarines would be destroyed either enroute to their ocean operating areas or on return. The mining of these areas could be accomplished by U.S. submarines using the MK 57 mine which will allow the submarine to remain in depths of water up to 1,200 feet.

If one looks at the resources and efforts devoted by the U.S. Navy to ASW weapon systems, he can see that ASW mining despite its effectiveness and economy, is the sick stepchild of our ASW capabilities. Our mine stockpiles in the United States and overseas that are earmarked for mining Soviet ports, are not only inadequate in number, but they are also antiquated. Funds for mine research and development have been habitually short, just as funds for mine stockpiling. As an example,

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the author first saw the MK 57 mine tested in 1952 and today there are approximately 125 in the Pacific Fleet and 150 in the Atlantic Fleet. There are some promising new mines under development, but development is slow, and emassing any appreciable numbers will be even slower.

It is recommended that the United States Navy increase and modernize their mine stockpile to permit a realistic capability to effectively mine the strategic areas around the Soviet Union.

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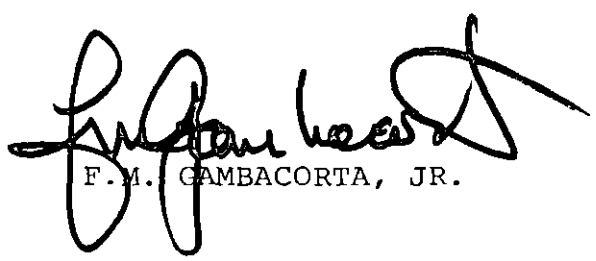
MEMORANDUM

From: Staff Intelligence Officer
To: Library Director

Subj: Declassification of Document

Ref: (a) Your memo Lib. File No. 88-76

1. I have reviewed CDR Flynn's paper as requested by the reference. With the exception of the Soviet OOB table I found no material of a classified nature in the paper. With the deletion of the OOB table the paper, in my opinion, could be declassified now. Otherwise automatic downgrading of the complete document in Dec '76 to Confidential is appropriate.



F.M. GAMBACORTA, JR.

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22 April 1976

In reply refer
to Lib. File No. 131-76

Ms. Mary G. Gordon, Library Technician
Naval Studies Board
National Research Council
2101 Constitution Avenue, N.W.
Washington, D.C. 20418

Dear Ms. Gordon:

In further response to your letter of January 14, 1976, the paper by Commander Richard E. Flynn, USN, Potentialities of Mine Warfare (U), dated 31 March 1964, has been assigned the following downgrading/declassification marking:

Classified by: Office of Naval Intelligence,
USSR Underwater Weapons and
Countermeasures Part II, Soviet
Mine Countermeasures (U)

Downgrade to Confidential on 31 December 1976

Not automatically declassified

Sincerely,

Earl R. Schwass
Library Director

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